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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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GREGORY L. MOURER
KLARQUIST SPARKMAN CAMPBELL LEIGH & WHINSTON ,LLP
121 SW SALMON STREET
ONE WORLD TRADE CENTER SUITE 1600
PORTLAND, OR 97204-2988

EXAMINER	
SUN, XIUQIN	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/673,599	HOWIE ET AL.	
	Examiner	Art Unit	
	Xiuqin Sun	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 6-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 6-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 6-8,11-13, 15-17, 19 and 21-25, 27, 29-38 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. (U.S. Pat. No. 4581712) in view of Stafford et al. (U.S. Pat. No. 4710064), Fisher, Jr. et al. (U.S. Pat. No. 4604706) and Stankus et al. (U.S. Pat. No. 5542788).

Perry et al. teach an apparatus and method for monitoring the dynamic loading rate on support systems used in an underground mine to withstand abutment pressure (see abstract; col. 1, lines 40-57; lines 65-68 and col. 2, lines 1-2), comprising: at least one load sensing device adapted to be coupled to one or more of the support systems used in the underground mine (col. 2, lines 27-42; col. 3, lines 58-68 and col. 4, lines 1-4); a programmable controller for processing support system loading information received from said at least one load sensing device (col. 2, lines 43-68; col. 3, lines 14-20 and col. 4, lines 5-23); and a printer that prints out reports generated by said programmable controller to provide warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems (col. 3, lines 21-57; col. 5, lines 60-66 and col. 6,

lines 3-7). Perry et al. further teach that: said load sensing device comprises a pressure transducer (col. 4, lines 52-59); said programmable controller comprises an embedded microprocessor (col. 5, lines 40-59); said programmable controller identifies and calculates loading rate changes on said load sensing device installed on the support systems (col. 1, lines 40-57; lines 65-68 and col. 2, lines 58-68); said programmable controller is programmed to sequentially generate a warning report as the loading rate increases on the support systems (col. 3, lines 21-57). Perry et al. further teach: providing timely warning indications directly to the miners through the use of alarm indicators, including audible alarm indicators (col. 1, lines 15-27; col. 5, lines 60-66 and col. 6, lines 3-7); the means for determining support system loading information is programmable (col. 2, lines 43-68; col. 3, lines 14-20 and col. 4, lines 5-23); and the determining is performed by a programmable controller (col. 2, lines 43-68; col. 3, lines 14-20 and col. 4, lines 5-23). Perry et al. further teach: at least one sensory indicator indicating safe conditions in the underground mine (col. 3, lines 21-57; col. 5, lines 60-66 and col. 6, lines 3-7); one or more computer-readable media comprising computer-executable instructions for performing said method (col. 2, lines 43-57); the programmable controller comprises a communications interface operable to receive values for controlling the sensory indicators (col. 2, lines 43-57); the means for activating sensory warning indicators is operable to receive a value via a communications interface means, and the value affects under what conditions the sensory warning indicators are activated (cols. 2-3, lines 43-57; col. 5, lines 60-66 and col. 6, lines 3-7); setting a value received via a communications interface, wherein the

value affects activation of one or more sensory warning indicators (cols. 2-3, lines 58-4 and col. 3, lines 21-40); said programmable controller is operable to set programmable values based at least on part on the loading conditions on the support systems (cols. 2-3, lines 43-4, col. 3, lines 21-40 and col. 4, lines 5-23). The teachings of Perry et al. further include means for indicating safe mining conditions (col. 3, lines 21-57; col. 5, lines 60-66 and col. 6, lines 3-7).

Perry et al. do not mention explicitly: said support systems are systems of a mobile roof support unit; reporting real-time analysis on the sensed data directly to the miners through the use of sensor indicators located in the vicinity of said at least one load sensing device and controlled by said programming controller. The Perry apparatus and method neither mention explicitly: said load sensing device is mounted with the underground mine support systems; said plurality of sensory indicators comprise audible alarm indicators; and said mobile roof support unit comprises a mobile retreat mining unit with a plurality of hydraulic cylinder support systems, crawler tracks, and a canopy, said mining unit used to withstand the abutment pressure of the underground mine.

Stafford et al. disclose a mobile mine-roof support unit and method of implementation, and teach: at least one load sensing device being adapted to be coupled to one or more of the support systems of the mobile support unit to monitor the dynamic loading rate on the support systems of said mobile roof support unit, and alerting miners of dangerous loading conditions on the support systems during mining operations (col. 3, lines 50-67; col. 4, lines 1-51; col. 22, lines 62-67 and col. 23, lines 1-

13). The teaching of Stafford et al. also includes: said mobile roof support unit comprises a mobile retreat mining unit with a plurality of hydraulic cylinder support systems, crawler tracks, and a canopy, said mining unit is used to withstand the abutment pressure of the underground mine (Fig. 1 and col. 6, lines 34-67 and col. 7, lines 1-8 and lines 36-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teaching of Stafford et al. with the invention of Perry et al. in order to provide a mobile mine-roof support unit with an improved safety monitoring system for alerting miners of dangerous loading conditions on the support systems during mining operations on a real-time basis (Stafford et al., Abstract; and Perry et al., Abstract).

Fisher, Jr. et al. disclose an apparatus for failure prediction of earth structures, and teach: reporting real-time analysis on the sensed data directly to the miners through the use of sensor indicators located in the vicinity of said at least one load sensing device and controlled by said programming controller (col. 3, lines 29-37, lines 47-60; col. 4, lines 5-12, lines 30-39; col. 5, lines 65-68; col. 6, lines 1-4; col. 14, lines 29-45; col. 15, lines 3-13; col. 16, lines 54-68 and col. 17, lines 1-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the Fisher, Jr. et al. alarm indicators in the Perry system in order to alert miners directly of any on-going development of for any hazardous mine conditions or damage to the equipment within the mine through visual or audio indicators located in the vicinity of the sensing device (Fisher, Jr. et al., abstract).

Stankus et al. disclose a method and apparatus for real-time monitoring mine roof support systems (see abstract; col. 4, lines 3-12; col. 16, lines 20-29; col. 19, lines 34-40 and col. 20, lines 47-52), and teaches: said load sensing device is mounted with the underground mine support systems (col. 4, lines 34-40; col. 4, lines 60-68; col. 5, lines 30-35 and lines 38-42).

It would have been obvious to include the teaching of Stankus load sensing device in the Perry apparatus in order to measure and record the load pressures exerted on the roof support device and identify the areas of maximum pressure in the mining operation in real time (Stankus et al., col. 4, lines 3-12).

3. Claims 9-10, 14, 18, 20, 26, 28, 39, 40 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. in view of Stafford et al., Fisher, Jr. et al. and Stankus et al., as applied to claims 1, 7, 12, 15-17, 25 and 27 above, and further in view of Scott et al. (U.S. Pat. No. 4480480).

Perry et al., Stafford et al., Fisher, Jr. et al. and Stankus et al. teach a method and apparatus that includes the subject matter discussed above except that: said plurality of sensory indicators comprise various color visual indicators including multicolor strobes, light-emitting diodes (LEDs), fluorescent visual indicators and the like; said programmable controller is programmed to sequentially report the increases of loading rate through different color lights; the load sensing device is welded onto the support systems during installation.

Scott et al. disclose a system and method for assessing the effect of a loading acting on a structure which teach the use of visual indicators to display output results

(col. 30, lines 26-36 and col. 18, lines 44-63;). Scott et al. further teach a way to install a load sensing device by welding it onto the support systems (col. 14, lines 58-64;).

It is obvious to one having ordinary skill in the art at the time the invention was made that various color visual indicators including multicolor strobes, light-emitting diodes (LEDs), fluorescent visual indicators, green light are well known in the art. It would have been obvious to one having ordinary skill in the art to include the teachings of Scott visual indicators and load sensor installation technique in the combination of Perry et al., Stafford et al., Fisher and Stankus in order to monitor the loading rate on the mine support systems more accurately and alert miners of dangerous loading conditions more effectively.

5. Claims 41 and 42 rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. in view of Stafford et al., Fisher, Jr. et al. and Stankus et al., as applied to claims 1 above, and further in view of Marion (U.S. Pat. No. 4979780).

Perry et al., Stafford et al., Fisher, Jr. et al. and Stankus et al. teach a method and apparatus that includes the subject matter discussed above except that: said mobile roof support unit is operable to support a mine roof during pillar extraction carried out in retreat pillar mining operations.

Marion teaches a mobile roof support unit which is operable to support a mine roof during pillar extraction, carried out in retreat pillar mining operations (col. 6, lines 16-48; col. 7, lines 24-60 and col. 10, lines 21-35).

It would have been obvious to include the teaching of Marion in the combination of Perry et al., Stafford et al., Fisher, Jr. et al. and Stankus et al. in order to provide a

mining safety monitoring system to a roof support unit operable to support a mine roof during pillar extraction (Marion, col. 1, lines 14-25 and lines 63-67 and col. 2, lines 1-7).

6. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al. (U.S. Pat. No. 4581712) in view of Stafford et al. (U.S. Pat. No. 4710064), Fisher, Jr. et al. (U.S. Pat. No. 4604706), Stankus et al. (U.S. Pat. No. 5542788) and Marion (U.S. Pat. No. 4979780).

Perry et al. teach an apparatus and method for monitoring the dynamic loading rate on support systems used in an underground mine to withstand abutment pressure (see abstract; col. 1, lines 40-57; lines 65-68 and col. 2, lines 1-2), comprising: at least one load sensing device adapted to be coupled to one or more of the support systems used in the underground mine (col. 2, lines 27-42; col. 3, lines 58-68 and col. 4, lines 1-4); a programmable controller for processing support system loading information received from said at least one load sensing device (col. 2, lines 43-68; col. 3, lines 14-20 and col. 4, lines 5-23); and a printer that prints out reports generated by said programmable controller to provide warning indications used as an aid in determining when to install additional support systems and alert miners of dangerous loading conditions on the support systems (col. 3, lines 21-57; col. 5, lines 60-66 and col. 6, lines 3-7).

Perry et al. do not mention explicitly: said support systems are systems of a mobile roof support unit; said unit is operable to support a mine roof during retreat pillar mining operations, reporting real-time analysis on the sensed data directly to the miners

through the use of a plurality of sensor indicators located in the vicinity of said at least one load sensing device and controlled by said programming controller.

Stafford et al. disclose a mobile mine-roof support unit and method of implementation, and teach: at least one load sensing device being adapted to be coupled to one or more of the support systems of the mobile support unit to monitor the dynamic loading rate on the support systems of said mobile roof support unit, and alerting miners of dangerous loading conditions on the support systems during mining operations (col. 3, lines 50-67; col. 4, lines 1-51; col. 22, lines 62-67 and col. 23, lines 1-13). The teaching of Stafford et al. also includes: said mobile roof support unit comprises a mobile retreat mining unit with a plurality of hydraulic cylinder support systems, crawler tracks, and a canopy, said mining unit is used to withstand the abutment pressure of the underground mine (Fig. 1 and col. 6, lines 34-67 and col. 7, lines 1-8 and lines 36-57).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teaching of Stafford et al. with the invention of Perry et al. in order to provide a mobile mine-roof support unit with an improved safety monitoring system for alerting miners of dangerous loading conditions on the support systems during mining operations on a real-time basis (Stafford et al., Abstract; and Perry et al., Abstract).

Fisher, Jr. et al. disclose an apparatus for failure prediction of earth structures, and teach: reporting real-time analysis on the sensed data directly to the miners through the use of sensor indicators located in the vicinity of said at least one load sensing

device and controlled by said programming controller (col. 3, lines 29-37, lines 47-60; col. 4, lines 5-12, lines 30-39; col. 5, lines 65-68; col. 6, lines 1-4; col. 14, lines 29-45; col. 15, lines 3-13; col. 16, lines 54-68 and col. 17, lines 1-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the Fisher, Jr. et al. alarm indicators in the Perry system in order to alert miners directly of any on-going development of for any hazardous mine conditions or damage to the equipment within the mine through visual or audio indicators located in the vicinity of the sensing device (Fisher, Jr. et al., abstract).

Stankus et al. disclose a method and apparatus for real-time monitoring mine roof support systems (see abstract; col. 4, lines 3-12; col. 16, lines 20-29; col. 19, lines 34-40 and col. 20, lines 47-52), and teaches: said load sensing device is mounted with the underground mine support systems (col. 4, lines 34-40; col. 4, lines 60-68; col. 5, lines 30-35 and lines 38-42).

It would have been obvious to include the teaching of Stankus load sensing device in the Perry apparatus in order to measure and record the load pressures exerted on the roof support device and identify the areas of maximum pressure in the mining operation in real time (Stankus et al., col. 4, lines 3-12).

Marion teaches a mobile roof support unit which is operable to support a mine roof during pillar extraction, carried out in retreat pillar mining operations (col. 6, lines 16-48; col. 7, lines 24-60 and col. 10, lines 21-35).

It would have been obvious to include the teaching of Marion in the combination of Perry et al., Stafford et al., Fisher, Jr. et al. and Stankus et al. in order to provide a

mining safety monitoring system to a roof support unit operable to support a mine roof during pillar extraction (Marion, col. 1, lines 14-25 and lines 63-67 and col. 2, lines 1-7).

Response to Arguments

7. Applicants' arguments with respect to claims 1-3, 6-45 dated October 4, 2004 have been considered but are moot in view of the new ground(s) of rejection.

Claims 1-3, 6-45 are rejected as new art references (U.S. Pat. No. 4710064 to Stafford et al.; and U.S. Pat. No. 4979780 to Marion) have been found to teach the limitations argued by the Applicants. Detailed responses are given in sections 2-6 as set forth above in this Office Action.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Xiuqin Sun
Examiner
Art Unit 2863

XS
November 22, 2004

John Barlow
Supervisory Patent Examiner
Technology Center 2800